

**BEFORE THE
PUBLIC SERVICE COMMISSION
OF WISCONSIN**

Joint Application of Wisconsin Power and Light
Company and Wisconsin Electric Power
Company for Certificate of Authority for
Edgewater Generating Station Unit 5 NOx
Reduction Project

Docket No. 5-CE-137

**PRE-FILED DIRECT TESTIMONY OF
Jeffrey J. Knier

FOR
WISCONSIN POWER AND LIGHT COMPANY**

October 20, 2009

1 **Q. Please state your name, business address, and employer.**

2 **A.** My name is Jeffrey J. Knier. My business address is 4902 North Biltmore Lane,
3 P. O. Box 77007, Madison, WI 53707-1007. I am employed by Alliant Energy
4 Corporate Services, Inc. (AECS).

5 **Q:** **On whose behalf are you testifying?**

6 **A.** I am testifying on behalf of Wisconsin Power and Light Company (WPL).

7 **Q. Please summarize your professional background and qualifications.**

8 **A.** I have been employed with AECS, Alliant Energy Corporation subsidiaries and
9 its predecessors since November, 1991, in various operational and corporate
10 services roles. In my current position, I am the project manager for the
11 Edgewater Generating Station Unit 5 NOx Reduction Project. As project
12 manager, I am responsible for all aspects of this project related to its scope,
13 schedule and cost.

1 **Q. Please describe your educational and professional experience**

2 **A.** I received an Associates Degree in Electro-Mechanical Technology from

3 Lakeshore Technical College in Cleveland, WI; a Bachelors Degree in

4 Manufacturing Engineering Systems Technology from Silver Lake College in

5 Manitowoc WI; and a Masters Degree in Business Administration from the

6 University of Iowa in Iowa City, Iowa. I have been employed by WPL and

7 subsequently by AECS since November, 1991. Since coming to work for WPL, I

8 have been involved in fossil plant operations and maintenance, operations

9 management, project engineering and management, business systems deployment,

10 and process improvement.

11 **Q. What is the purpose of your testimony?**

12 **A.** The purpose of my testimony is to introduce the proposed NOx reduction project

13 at Edgewater Generating Station on Unit 5 and provide an overview of the scope,

14 schedule and cost estimate project.

15 **Q. Are you sponsoring any exhibits with your testimony?**

16 **A.** Yes. As the project manager for the Edgewater Generating Station Unit 5 NOx

17 reduction project, I provided oversight of the preparation of the joint owners’

18 application in this proceeding. I am sponsoring Exhibit 1.1, which is the

19 application for the “Wisconsin Power and Light Company and Wisconsin Electric

20 Power Company for a certificate of authority to install a NOx reduction system,

21 Selective Catalytic Reduction, at the Edgewater Generating Station on unit 5”

22 (hereinafter the “Application”) and the appendices to the Application.

23 **Q: Why is this project needed?**

- 1 **A.** The installation of this equipment is being proposed to comply with Wisconsin
2 Administrative Code, Chapter NR 428. The implementation of this project
3 focuses specifically on compliance for phase II of the Reasonably Available
4 Control Technology (RACT) rule, which becomes effective May 1, 2013.
- 5 **Q.** **Please describe the proposed project.**
- 6 **A.** The proposed project includes the installation of a selective catalytic reduction
7 (SCR) system, induced draft fans, air compressors, and ammonia storage and
8 unloading systems designed to reduce mono nitrogen oxides (NO_x) emissions.
9 These reductions are necessary to meet RACT compliance requirements at the
10 Edgewater Generating Station. In an SCR system, NO_x is removed through a
11 chemical reaction with an ammonia-based reagent (NH₃), resulting in molecular
12 nitrogen (N₂) and water vapor (H₂O). The NO_x reduction reactions occur as the
13 flue gas passes through the catalyst chamber. The Edgewater Unit 5 SCR is
14 designed to use 19% aqueous ammonia solution as the reducing agent.
15 (Anhydrous ammonia was also considered, but discounted due to associated
16 safety concerns with storing and handling a toxic compressed gas.) The aqueous
17 ammonia reagent is vaporized and injected into the flue gas downstream of the
18 economizer through an injection grid mounted in the ductwork. Compressed air
19 is used to atomize the aqueous ammonia reagent. The hot flue gas and atomized
20 reagent then flow into the catalyst chamber where NO_x is reduced to nitrogen and
21 water. The nitrogen gas and water vapor leave the SCR system and flow out the
22 stack with the flue gas.
- 23 **Q.** **How were the preliminary design, engineering and cost estimates developed?**

1 **A.** The preliminary engineering, removal efficiency calculations and cost estimates
2 were developed by URS-Washington Division as part of a WPL fleet-wide CACP
3 compliance and technology assessment.

4 **Q. What are the costs for the project?**

5 **A.** The SCR project is expected to cost approximately \$153 Million. WPL's share of
6 this cost is approximately \$115 Million, and WEPCO's share of this cost is
7 approximately \$38 Million. The costs presented in the CA application represent
8 the cost estimate developed by URS-Washington Division prepared in January
9 2008. The total project cost also includes the joint owner's internal costs, the cost
10 of spare equipment, contingency, and insurance expenditures.

11 **Q. Did the company evaluate other alternatives to the proposed project?**

12 **A.** Yes. WPL looked at a variety of alternatives to reduce NOx emissions from
13 Edgewater Unit 5. Among the alternatives that WPL considered were: Rich
14 Reagent Injection (RRI), Selective Non-Catalytic Reduction (SNCR), Hybrid
15 SCR, and full size SCR.

16 **Q. Can you please synopsise the results of this analysis?**

17 **A.** Yes. Through WPL's analysis, it was determined that the SNCR and RRI
18 systems were not capable of achieving the same level of NOx reductions as an
19 SCR and likely not capable of yielding NOx emission reductions necessary to
20 meet the RACT requirements for Edgewater Unit 5 and the Edgewater Generating
21 Station. As such, WPL determined that this technology was likely not
22 appropriate.

1 The published removal rates from a Hybrid SCR system indicated that a
2 Hybrid SCR system could potentially result in RACT compliance at Edgewater
3 Unit 5; however, such compliance would likely only be marginal. Additionally,
4 the Hybrid SCR has not been commercially proven on a boiler as large as
5 Edgewater Unit 5. For these reasons, WPL determined that this technology was
6 not appropriate for the Edgewater Unit 5 at this time.

7 Of the commercially proven technologies, WPL determined that only the
8 full size SCR is capable of (1) reducing emissions to levels that enable
9 compliance with RACT Phase II requirements for Edgewater Unit 5 with a
10 reasonable compliance margin and (2) potentially allow for facility-wide
11 compliance

12 **Q. Have you discussed the project with local communities that will be**
13 **impacted?**

14 **A.** Yes. A meeting was held on March 18, 2009 at the Edgewater Station to inform
15 local community leaders and labor leadership of the project. Approximately 25
16 labor and community leaders attended. During the meeting specifics of the
17 project were shared with all in attendance. Based on feedback from the meeting,
18 WPL believes the community is supportive of the project.

19 **Q. When does the company believe that an Order for the project needs to be**
20 **issued to ensure the project is constructed in time to meet the environmental**
21 **requirements?**

22 **A.** WPL is currently planning completion of this project during a planned outage on
23 Unit 5 at the Edgewater Generating Station in the Fall of 2012. Average

1 durations for engineering, procurement and construction of SCR systems is
2 approximately 24 months from limited notice to proceed (LNTP) to mechanical
3 completion of the system. Variables that may impact the completion of this
4 project within the typical 24 month time frame include the impacts of weather on
5 schedule and productivity, availability of long lead time procurement items, and
6 availability of craft labor to support the construction of this project. With these
7 variables in mind, approval of this project by April 2010 will allow WPL the
8 necessary schedule contingency to have the SCR system in service and optimized
9 for the phase 2 RACT compliance date.

10 **Q. What is the projected milestone schedule to meet compliance by May 1,**
11 **2013?**

12 **A.** WPL filed the Application for this project with the Commission in November,
13 2008, and is anticipating that an Order will be issued by April 30, 2010.
14 Assuming an April 30, 2010, approval date WPL would plan to order materials in
15 May, 2010 and begin construction in September 2010. This would allow for the
16 SCR to be tied in during a Fall 2012 planned outage.

17 **Q. Does this conclude your direct testimony?**

18 **A.** Yes.